

WHAT IS CLAIMED IS:

1. An electrical insulating vapor grown carbon fiber comprising a vapor grown carbon fiber having a fiber diameter of 0.01 to 0.5 μm , wherein the surface thereof is partially or entirely coated with an electrical insulating material.

2. The electrical insulating vapor grown carbon fiber as described in Claim 1, wherein the electrical insulating material is boron nitride.

3. The electrical insulating vapor grown carbon fiber as described in Claim 2, wherein the boron nitride is present in an amount of about 2% by mass or more based on the entire amount of vapor grown carbon fiber and has a Co value of 0.680 nm or less.

4. The electrical insulating vapor grown carbon fiber as described in Claim 2, wherein the amount of boron in a depth of 1 nm from the surface of the vapor grown carbon fiber is about 10% by mass or more.

5. The electrical insulating vapor grown carbon fiber as described in Claim 1, wherein the fiber has a specific resistivity of about $10^3 \Omega \cdot \text{cm}$ or more and a heat conductivity of about $150 \text{ Wm}^{-1}\text{K}^{-1}$ or more when compressed at a bulk density of 0.8 g/cm^3 .

6. A method for producing an electrical insulating vapor grown carbon fiber, comprising mixing a boron compound with a vapor grown carbon fiber having a fiber diameter of 0.01 to 0.5 μm to form a mixture and heat-treating the mixture at $2,000^\circ\text{C}$ or more in the presence of a nitrogen compound.

7. A method for producing an electrical insulating vapor grown carbon fiber coated with boron nitride, comprising mixing a boron compound with a vapor grown carbon fiber having a fiber diameter of 0.01 to 0.5 μm to form a mixture, compressing the mixture and heat-treating the compressed mixture at 2,000°C or more in the presence of a nitrogen compound.

8. The method for producing an electrical insulating vapor grown carbon fiber as described in Claim 6, wherein the nitrogen compound is nitrogen.

9. The method for producing an electrical insulating vapor grown carbon fiber as described in Claim 6, wherein the boron compound is at least one member selected from the group consisting of elementary boron, boric acid, borate, boron oxide, B_4C and boron nitride.

10. The method for producing an electrical insulating vapor grown carbon fiber as described in Claim 6, wherein the mixture of the boron compound and the vapor grown carbon fiber has a boron concentration of about 1 to about 30% by mass in terms of the boron element.

11. An electrical insulating composite material comprising a synthetic resin or synthetic rubber composition containing an electrical insulating vapor grown carbon fiber comprising a vapor grown carbon fiber having a fiber diameter of 0.01 to 0.5 μm , wherein the surface thereof is partially or entirely coated with an electrical insulating material.

12. The electrical insulating composite material as described in Claim 11, wherein the electrical insulating material is boron nitride.

13. The electrical insulating composite material as described in Claim 12,, wherein the boron nitride is present in an amount of about 2% by mass or more based on an entire amount of vapor grown carbon fiber and has a Co value of 0.680 nm or less.

14. The electrical insulating composite material as described in Claim 12, wherein the amount of boron in a depth of 1 nm from the surface of vapor grown carbon fiber is about 10% by mass or more.

15. The electrical insulating composite material as described in Claim 11, wherein the fiber has a specific resistivity of about $10^3 \Omega \cdot \text{cm}$ or more and a heat conductivity of about $150 \text{ Wm}^{-1}\text{K}^{-1}$ or more when compressed at a bulk density of 0.8 g/cm^3

16. A heat-releasing material comprising an electrical insulating vapor grown carbon fiber having a fiber diameter of 0.01 to $0.5 \mu\text{m}$, wherein the surface thereof is partially or entirely coated with an electrical insulating material.

17. The heat-releasing material as described in Claim 16, wherein the electrical insulating material is boron nitride.

18. The heat-releasing material as described in Claim 17, wherein the boron nitride is present in an amount of about 2% by mass or more based on an entire amount of vapor grown carbon fiber and the fiber has a Co value of 0.680 nm or less.

19. The heat-releasing material as described in Claim 17, wherein the amount of boron in a depth of 1 nm from the surface of vapor grown carbon fiber is about 10% by mass or more.

